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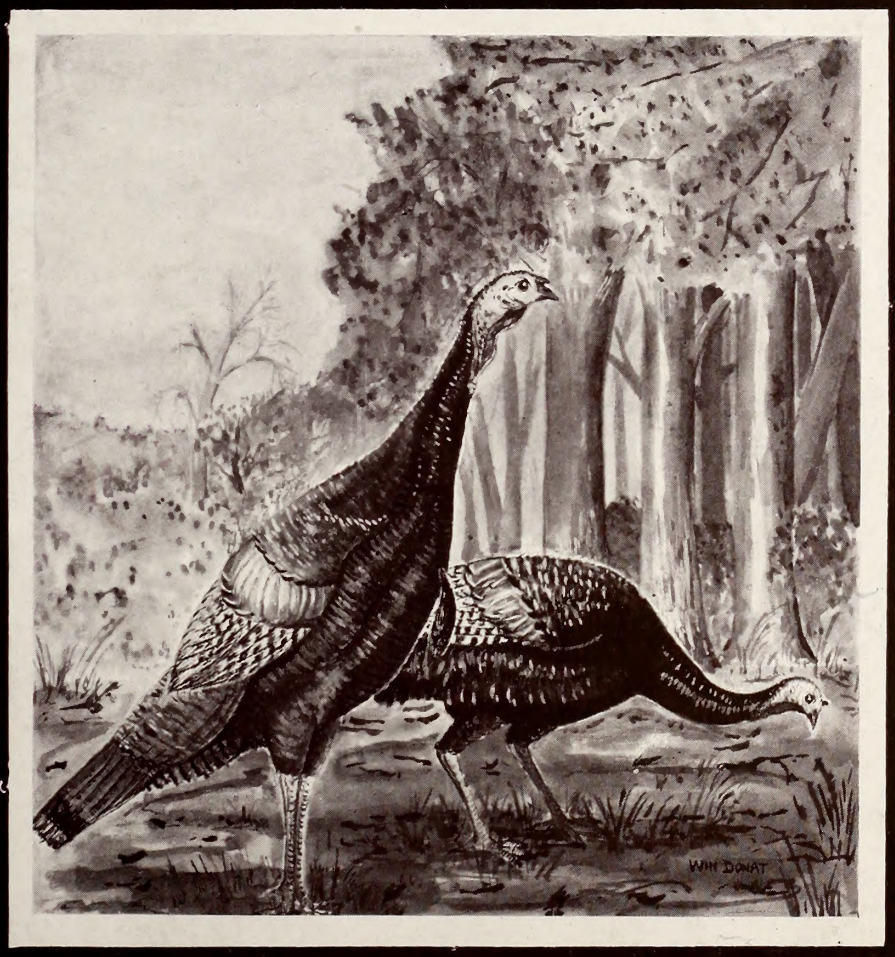
Wildlife
IN NORTH CAROLINA



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WILDLIFE IN NORTH CAROLINA

The Official Publication of The North Carolina Wildlife Resources Commission, Raleigh

A monthly magazine devoted to the protection and restoration of our Wildlife Resources and to the improvement of hunting and fishing in North Carolina

STATE OF NORTH CAROLINA

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November 1948 **Vol. XII No. 7**

COVER

The 1948 turkey season will open on traditional turkey day. Only gobblers may be killed this year. The picture is from a water color by Artist Win Donat, who is the Assistant Chief of the Education Division.

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Wildlife in North Carolina recognizes the need for close coöperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication all news items, articles, photographs, and other material dealing with the various activities which combine to make North Carolina a better state for hunting and fishing. Full credit is given for all material published.

Application has been made for entrance as second class matter at the Post Office at Raleigh, North Carolina, February 23, 1948, under the act of August 23, 1912.

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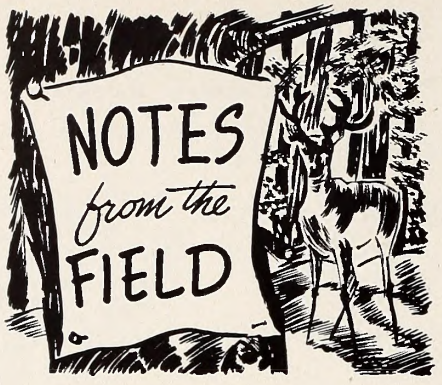
November marks the approach of winter months and the opening of seasons on farm game. North Carolina sportsmen owe a debt of gratitude to farmers who year after year harbor the game species most sought-after by sportsmen. Real sportsmen will ask for farmers' permission before going on their land, and above all, respect their property rights.



SOME FACTS about QUAIL COVEY SIZES

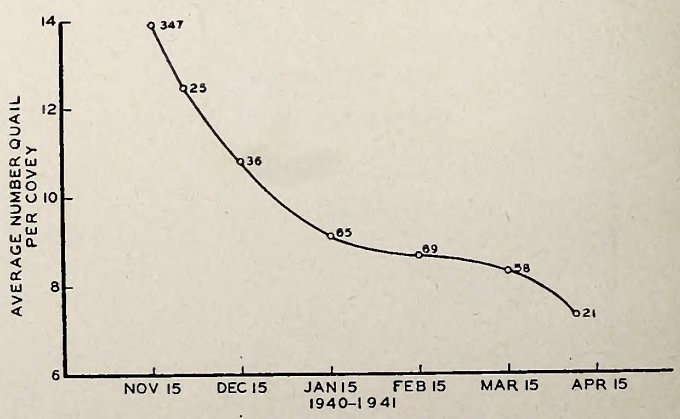
There is some information here which may surprise even the "Old Timers"

By permissiom of Alabama Conservation Commission

By Frederick S. Barkalow, Jr.
Professor of Zoology
In Charge of Wildlife Conservation
and Management
North Carolina State College of Agriculture
and Engineering

"You know—on the last day of the season I got into a covey of 18 birds. The covey was so big I'm sure they hadn't been shot into this year! I killed eight and scattered them good so there ought to be three or four coveys there next season. I got into two more coveys with only five birds each in them. Now, if we shortened the season a week we would leave lots more breeders and have more quail next season." Yes, this conversation is almost surely to take place any time quail hunters get together for a post-season talk. The opinions expressed by this hunter were generally believed by sportsmen and game technicians alike back in the early 'thirties. With the publication of Stoddard's (1931) book *The Bobwhite Quail* a good many of us had to change our opinions about the habits and activities of Bobwhite. It's been nearly 18 years since the appearance of this book and yet there exists in the minds of numerous quail hunters many misconceptions about our most popular game bird.

Let's take a little look into the habits and covey organization of the bobwhite and check on some of these opinions. By trapping and banding birds on large areas it is possible to trace the movements of individuals and to follow most of the covey members. As a result of many years banding, Mr. Stoddard was able to show that the individuals in a fall covey were not necessarily the same birds found in the same location the following spring. In many instances there was a constant interchange of individuals from one covey to another. When a covey was shot down or depleted from natural losses below a certain limit, the remaining birds either combined with another covey or the survivors of a nearby covey joined it. This intense "desire" to be with its kind causes birds which have been scattered to join a strange covey if their own cannot be found readily. The strange covey will usually accept and welcome this addition, especially if its numbers are small. This bird may later rejoin its original bevy if an opportunity presents, but likely as not, it will remain with the strange covey. The discovery of this interchange entirely exploded the myth that coveying birds must be shot up and scattered to prevent inbreeding or that it was necessary to bring in "new blood." More and more evidence is accumulating which indicates that the release of additional birds in occupied ranges (especially pen reared ones) is not only worthless but actually detrimental —but that's another story. The combining of depleted coveys late in the winter to form larger ones gives many of us food for thought. If big coveys are shot down to four or five birds and then are joined by four or five from a nearby covey, it is easy to understand what could happen to the quail population over a large area when combined coveys are further shot. The bright spot in the picture is that, when hunting gets too poor, most sportsmen will not go into the field after the remaining birds.



AVERAGE COVEY SIZE BY MONTH
(NUMBER OF BEVYS USED IN OBTAINING AVERAGE COVEY SIZE IS INDICATED BY FIGURE OPPOSITE EACH POINT)

Figure 1.

The bobwhite's breeding potential is usually sufficient to repopulate the range, to its carrying capacity in one or at most two breeding seasons.

Data obtained by the author and his associates during a state-wide inventory* indicate that quail on Alabama's farmland show the same tendency to combine as those of Stoddard's on managed preserves in South Georgia. Figure 1 is based on 621 different coveys located during the 1940-41 census. The first point on the curve is the arithmetic mean of 347 coveys located by the game wardens in November, 1940, immediately preceding the hunting season. The average covey size was 13.91 birds. The other points on the curve were plotted from data given by Webb, Martin, and Wheeler (1941).

A careful analysis of the population data and average covey size curve obtained during the census tells many stories to the game biologist and the sportsman who really know quail. Here are the data:

On November 15, 1940 (5 days before the hunting season opened) Alabama wardens, using a dog census technique developed by the inventory personnel, reported 2,185,000 birds on Alabama's farmland. The 347 coveys on the sample areas averaged 13.91 birds per covey. On February 1, 1941 (three weeks before the season closed) the inventory personnel reported a population of 1,085,000 remaining. The number of birds per 100 acres in January was 8.45 and in February was 7.83.

Dog census work ceased in April. Table I gives the average covey sizes by months. Figure 1 is the curve plotted from these data.

Now, fellows, using our knowledge of quail and the data given above—let's see what we can make of these figures. The first thing we see in the curve is that the average size of the April coveys is only slightly more than one-half as large as the pre-season November ones (7.33 compared with 13.91). Stoddard's (*ibid.*) banding studies showed that on many areas, the average covey size at the end of the hunting season was almost as large as it was at the beginning. In several instances the average size in April was larger than that of the fall. He attributed this, in part, to the gregarious nature of the birds which caused them to combine with other coveys when their numbers were depleted. Figure 1 shows a continuous decrease in the average covey size from the middle of November, 1940, to the first week in April, 1941. A superficial analysis would indicate that our data were not in agreement with Stoddard's; however, this is not the case. His banding work was carried on in areas of relatively heavy quail concentrations; when a covey on such an area is badly scattered the chances of an individual meeting another bevy before it can rejoin its own is relatively great. In contrast to Mr. Stoddard's work, ours was done in areas of much lower concentrations and in isolated rather than uniform covey ranges. The chances of scattered birds encountering another covey before they found their own group was much smaller. The distances to be traversed by covey survivors in order to combine with adjacent bevys is greater and for these reasons, the actual progressive decrease in population is reflected in the average covey size.

The availability of food and cover is another factor which permits refuge quail to remain in approximately the same size bevys throughout the fall and spring. Quail preserves are managed to provide a uniform supply of food and cover throughout the season, consequently, the area will support a 15 bird bevy as well in the fall as in the spring. This was not the case in the majority of quail coverts throughout Alabama. This is perhaps true in North Carolina also. There is a scarcity of food and cover in the spring, and ranges which supported a 15 bird fall covey will usually have a carrying capacity of only 7 or 8 birds in April. This was found to be true also in the northern bob-white's winter territory (Errington and Hamerstrom: 1936). This factor alone prevents depleted spring bevys on unmanaged farmland from attaining the size of fall coveys. Some combination did take place, but this union did not result, except in a few cases, in large spring coveys.

TABLE I

Month	Number Coveys Found	Average Number of Birds Per Covey
November (warden preseason)	347	13.91
November	25	12.58
December	36	10.86
January	65	9.15
February	69	8.70
March	58	8.32
April (first half)	21	7.33

This bevy size decrease suggests several possibilities: either there was a progressive decrease in the amount of available food and cover, thus preventing depleted coveys from combining into large composite groups; the mortality was greater than the "desire" or ability to combine; or both factors are reflected by the graph. Our field observations indicated adequate food and cover at least through January. The steep population drop from Novem-

* "Inventory of Wildlife Resources of Alabama." This work was undertaken with Federal Aid to Wildlife—Restoration funds under the Pittman-Robertson Project number Ala. 1-R.

ber 15-January 15, therefore, must be due almost entirely to hunting and natural mortality and not to large coveys splitting because of a food deficiency in their covey range or to depleted coveys not combining because of this food shortage. Covey combination did take place during the period November 15-February 1. This may be easily seen from an examination of the curve and our population figures.

The warden census indicated that the farmland quail population in Alabama on November 15, 1940, was 2,185,000 birds while our inventory figure as of February 1, 1941, indicated the population had dropped to 1,085,000; a decrease of approximately 50 per cent. The average covey size on November 15, 1940, was 13.9 while the average bevy size on February 1, 1941, taken from the curve, has a value of 8.8 birds. This drop of 5.1 in the average number of birds per covey represents a decrease of only 36.7 per cent, a discrepancy explained by the depleted coveys combining with nearby ones. Stoddard's banding work and our own observations in the field help confirm this conclusion.

The curve levels off from January 15 to March 15 which is attributed to a decrease in mortality and an increased combining rate of depleted bevys. Stoddard found the combining rate to be greater in the spring than in the fall. It is well known that the reduction of the carrying capacity by dying of the herbaceous vegetation and falling leaves seem to accelerate the natural mortality of bobwhite during the fall (Errington and Hamerstrom: 1935: and others).

Comparing the population found in January (8.45 quail per 100 acres) with February (7.83 birds per 100 acres) a population decrease of 7.3 per cent is indicated. If we assume the combining rate to be the same during these two periods, a simple ratio will show what the expected per cent difference in covey size should be during the latter period. We find it should be 5.2 per cent smaller instead of 7.3 per cent. If we take the value from the curve we find it to be only 4.8 per cent smaller which means, of course, that the combining rate was not the same during the two periods but was greater during the January-February period than the November-January one.

Good bird dogs not only improve hunting—they bring in cripples that otherwise would be lost.

The figures were obtained from relatively small samples and different populations. We feel that they should be considered accurate only to the extent of indicating the increased combining rate as the season progresses.

The above illustrations bring out quite clearly that quail coveys do combine on unmanaged farmland and that the combining rate is greater as the season progresses.

When large late season coveys are found by sportsmen on open hunting areas, it is more likely a consolidation of several depleted coveys where there is sufficient food and cover to support them rather than being an "unshot" bevy.

Bobwhite is caught between two opposing forces, his instinct to be with his kind and the food and cover available on his covey range. If all members of the covey are able to obtain sufficient food within their daily cruising radius, and other conditions are favorable, the covey size will probably remain unchanged. If there is an abundance of food and cover it will likely receive additional members. If each member cannot obtain sufficient food within its daily cruising radius the covey will probably split into components, one of which will remain or the entire covey will move to a favorable range elsewhere. If a favorable habitat isn't available, the excess birds will be quickly eliminated by predators or hunting (Errington and Stoddard: 1938). Stoddard (*ibid.*: 172) pointed out that a covey was really a concentration of quail in a particular favored spot rather than a home for certain individuals year after year. Where these habitats remain the same and the carrying capacity stays constant, a covey found in this location each season will vary little in size (Errington and Hamerstrom: 1936). Where the number of coveys found year after year in a particular area remains approximately the same, it is absurd to believe that "shooting-up" the coveys or restocking with "new blood," will increase the number of coveys or permanently increase the resident covey sizes. *These coveys are there simply as a result of favorable habitat conditions.* The constancy of the fall covey sizes and numbers is a key to the problem. If the number of coveys is to be increased, *additional bevy ranges must be provided,* not more trapped or pen-raised birds dumped in. You can't increase the capacity of a full water bucket by adding more water to it.

The sharp decrease in the average covey size in April is due largely to the dispersal of birds to begin nesting and is not due to increased mortality.

Assuming the combining rate to be essentially the same throughout the hunting season (20 Nov.-20 Feb.) we see from the curve that over one and

The Author tabulates quail census data used in this article while his "census" dog impatiently waits to flush more coveys from good bird cover.

one-half times as many birds per covey were killed the first month of the season (20 Nov.-20 Dec.) as the next two months combined (Dec. 20-Feb. 20)! The rate of mortality is approximately proportional to the decrease in the number of birds per covey. Serious error is avoided here because the combining rate, a vital factor in explaining quail habits, is relatively small. In order to cut down the hunter harvest 50 per cent, we would have to shorten the season from 3 months to 3 weeks! If the season were shortened to 3 weeks we would, of course, still be unable to cut the hunter kill in half because a greater number of sportsmen would take the field. Lopping a month off the end of the season would save less than 9 per cent. Ruhl (1947), reporting on the eight years operation of a wildlife experiment station near Lansing, Michigan, states "The Rose Lake pheasant (cocks only) harvest closely follows the pattern of 70 per cent of the total kill taken the first week, 20 per cent the second week, and 10 per cent the third week." The Alabama bobwhite mortality pattern taken from the curve, of 58.6 per cent the first month, 32.7 per cent the second, and 8.7 per cent the third month is strikingly similar to that for the pheasant kill during a 3 week season! This mortality pattern has been known for many years by the game biologist but its significance to setting a game season has not been appreciated by the average sportsman. These data indicate that, in this instance, it would make little difference in the survival of breeding stock if the season were shortened or lengthened a week or two. This makes the violent arguments whether the season should be shortened or lengthened a day or so a little ridiculous—doesn't it, fellows? The important considerations in setting any game season, *If the game is to receive some consideration and the sportsman is to realize the maximum recreation and harvest* are:

Does the season open at a time when there is a high percentage of immature animals which are easily killed? Is it open when the females are carrying or caring for young? Is it open at a time when the species are unwary (rutting season, etc.) and an excessive kill can be easily made? How long can the season be kept open to provide the maximum recreation and harvest without endangering the breeding stock?

Well, fellows, it looks as if we've squeezed about as much information out of these data as we can to convince our friend that his big covey might have been shot into and that scattering them wouldn't increase the birds there next year. There are other considerations to be taken in evaluating this curve but I think we'd better leave them to the game biologists.

Acknowledgments

The author wishes to express his appreciation to Mr. C. Graham Hixon, Chief of the Alabama

(Continued on page twenty-one)

BLUEPRINTS for WILDLIFE HOMES

"We Must Plant in the Spring Where We Hunt in the Fall"

EUGENE E. SCHWALL

The Wildlife Resources Commission through its expanded Coöperative Farm Game Habitat Development Program, is distributing three perennial plants next spring which sportsmen can recommend to farmers with confidence. These perennials are: bicolor lespedeza, sericea lespedeza, and multiflora rose.

In recent years sportsmen have observed a steady decline in the abundance of farm game throughout the State. They realize that unless positive measures are taken in the very near future, small game hunting as a recreation may be a thing of the past. Several factors have helped to bring about this decline, chief among them being the steady shrinkage of natural farm game habitat. This is particularly true as regards available late winter food.

Sportsmen have tried to compensate for the lack of suitable game food and cover by planting annual food patches and asking farmers to let fence rows grow up in cover. Neither of these practices have proved entirely satisfactory to the sportsmen, nor have they always been acceptable to the landowner. Annual food patches, such as soybeans and cowpeas, provide excellent food for the fall and early winter months, but by late winter the seed is either gone or unfit for consumption. The expense of replanting these food patches each year is an unnecessary burden on most sportsmen's clubs. Today farmers are utilizing more of their tillable land for crops and they are not so willing to provide good agricultural land for the planting of food patches for wildlife. Clean farming has resulted in the elimination of wildlife cover lanes along fence rows in many instances and farmers are not willing to allow these areas to grow up in weeds and brush again. We need wildlife food and cover plants that can be planted on parts of the farm where they will not interfere with the landowner's normal activities. We need a plant which will produce an abundance of food and cover throughout the late winter months, a plant that will also produce year after year without replacement or excessive maintenance costs. It is also extremely important that these plants provide some benefit to the landowner over and above their wildlife value.

In order to give aid to sportsmen in getting across the value of these plants to the landowner, biologists of the Commission are establishing demonstration plantings on selected areas throughout the State. Since it is essentially a coöperative project, sportsmen's clubs will have the opportunity to assist in locating the areas, providing equipment and materials other than planting stock, and financing planting operations. Youth, as well as adult groups, will be able to participate in the planting program. County agricultural agents, Soil Conservation Service personnel and other informed persons will assist in the selection and planning of the areas. After the demonstration areas have been planted according to the specifications of our biologists, tours of the areas will be arranged so that sportsmen and landowners throughout the State can see how similar plantings can be made in their communities.

The commission will supply land owners and sportsmen with these perennial plants free of charge so long as the supply lasts. The only requirement is that the landowner plant them according to recommendations made by our field biologists and protect them to insure maximum returns from the Commission's investment in planting stock. Application blanks may be obtained from field men of the Commission or by writing direct to the North Carolina Wildlife Resources Commission, Raleigh. Project personnel will be limited to three biologists the first year, but technical assistance will be given to all cooperators in so far as this is possible.

Sportsmen may obtain these plants provided they have selected a landowner who will coöperate to the extent of protecting the planting after it is made. Individual sportsmen or clubs can finance the cost of planting or they can plant the shrubs themselves. Because of the beneficial qualities of the shrubs farmers will be glad to have them on their land. One of

our greatest problems is creating better farmer-sportsmen relations. These plants will help the sportsmen solve this problem.

The three perennials to be distributed by the Commission in the spring of 1949 are described in the following paragraphs.

BICOLOR

One and one-half million bicolor shrubs will be distributed next spring through the new Coöperative Farm Game Habitat Development Project. An additional 1,000 pounds of bicolor seed will be distributed to supplement seedling distribution.

Bicolor has been used for several years by the Soil Conservation Service as a woodland border. It is somewhat shade tolerant and will occupy the usually unproductive strip between woodland and cropland. It is a valuable erosion control plant, is attractive to honeybees, and produces an abundance of seeds some of which remain on the plant until late winter. It is a valuable source of food for quail and songbirds. Its bark is relished by rabbits.

Bicolor is most productive if planted in rows. Five to seven rows in a strip alongside a woodland is about right. Rows should be about three feet apart, with plants set at 2 to 2½ foot intervals. The planting site must be well prepared in advance of planting and about 400 pounds of 0-12-12 fertilizer to the acre will increase growth considerably. Sericea lespedeza can be planted in a strip alongside the bicolor whenever the border strip is wide enough. An ideal food and cover strip would be one approximately 30 feet wide, with bicolor occupying at least 15 feet and possibly 20 feet of the width.

SERICEA

Sericea has been used by the Soil Conservation service for a number of years. At first it was considered to be a valuable food producer, but more recently it is looked upon as a more valuable nesting and escape cover plant. It provides an excellent cover for turn rows along cultivated fields and produces hay for the farmer.

Sericea should be broadcast on a well prepared planting strip at a rate of 15 to 20 pounds per acre, fertilizing the same as for bicolor. Both bicolor and sericea must be protected from grazing if maximum wildlife food and cover are to be produced.

The Wildlife Resources Commission through another Farm Game Habitat Restoration Project, under the direction of W. E. McConnaughey, has provided bicolor and sericea to the coöperators of the soil conservation districts for the past four years and will do so again during the spring of 1949. This project works closely with farm planners of the Soil Conservation Service.

The new coöperative Farm Game Development Project will expand the distribution of these plants to include any farm in the State, whether in a soil conservation district or not. The new coöperative project will also distribute a limited quantity of multiflora rose to coöperators desiring to establish "living fences" on their land.

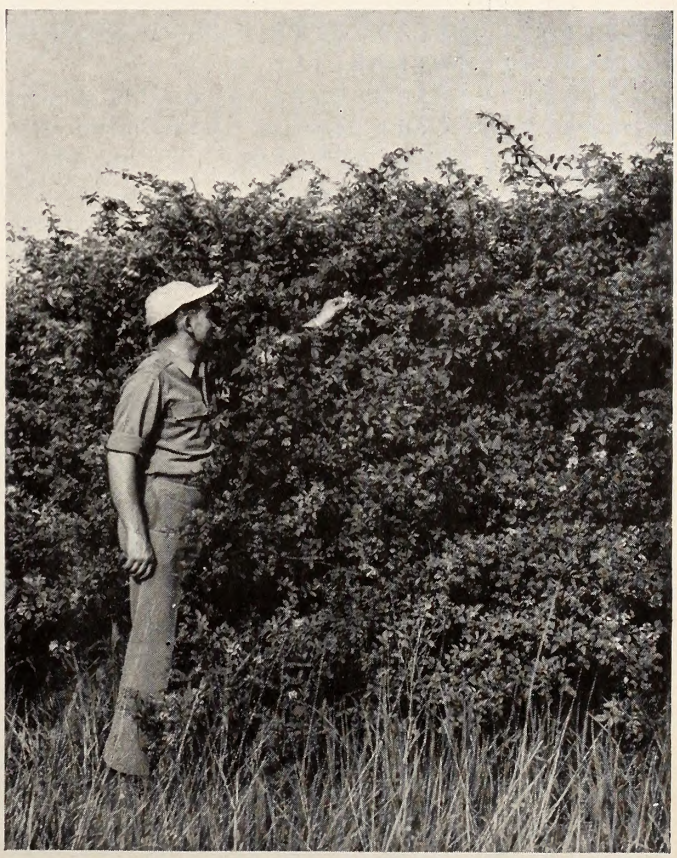
MULTIFLORA ROSE

Multiflora is an Asiatic shrub well suited for permanent living fences. It has been tested by the Soil Conservation Service and in the past ten years extensive plantings have been made in the Midwest and in New England. Few plantings have been made in the Southeast up to the present time, but it is sure to become an important plant in the near future.

Multiflora grows to a height of eight feet on the better soils and occupies approximately eight to ten feet of fence row. Its thorny stems and dense growth provide an impenetrable fence capable of holding any livestock within three to six years after planting. It shades out grass and weeds, thus eliminating rodent habitat. It makes an excellent travel lane for quail and rabbits and provides protective cover throughout the year.

The flowers of multiflora are attractive to honeybees and the fruit forms an emergency food for birds.

Multiflora is easy to plant and will last the life time of the landowner, whereas ordinary wire fences must be continually repaired or replaced. A good multiflora hedge will eliminate trespassing by man or dogs. Multiflora can also be used to control erosion



In summer months multiflora rose is an attractive addition to the landscape. (Photo Courtesy Missouri Conservation Commission).

along streambanks, around farm ponds, gullies, or other exposed areas.

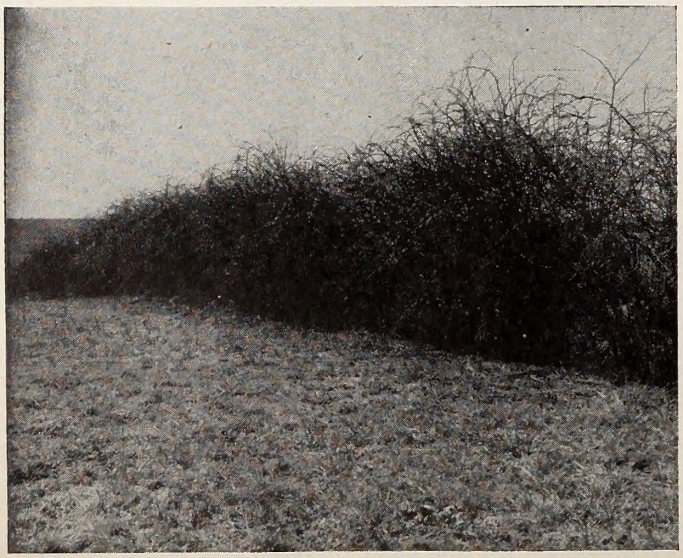
Multiflora produces the best hedgerow if planted in a single row, with plants set at intervals of one foot. A strip about four feet wide should be cleared well in advance of planting. A single bottom plough can be used to throw up a furrow after which the plants, which have been protected from drying out, are placed against the slice at intervals of one foot. Then a second furrow is thrown against the first, covering the roots of the plants. The tractor wheel is then run over the row of plants to pack the soil around the roots. Any good nitrogen fertilizer added to the soil before planting will assist the plants by producing a good growth the first year. Tobacco planters modified to handle multiflora will speed up the planting process considerably.

OTHER MANAGEMENT PRACTICES

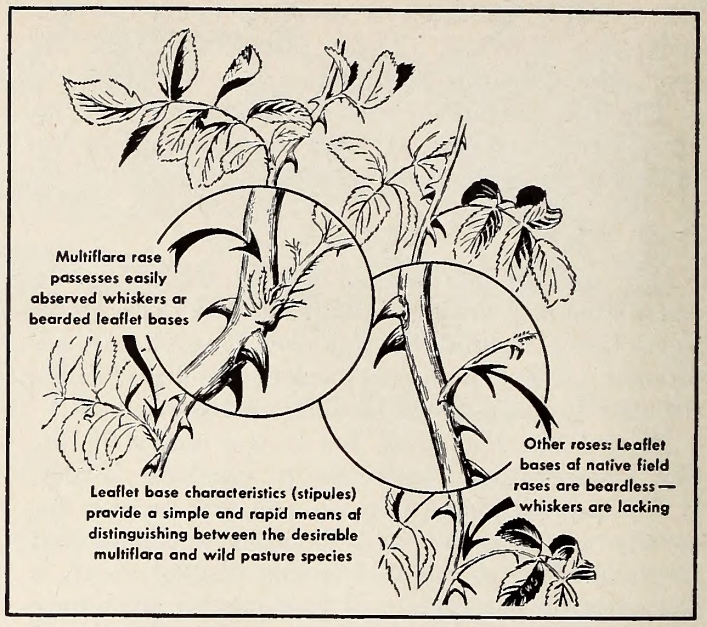
A number of other plants will be tried on the demonstration areas, but principal emphasis will be on the planting of the three perennials already described. Additional practices such as disking, controlled burning, and selective cutting may be practiced on the demonstration areas and advice will be given on these special practices whenever requested; but again principal emphasis will be placed on the planting of perennials.

The planting program is designed to benefit quail and rabbit, but wherever squirrel management techniques are applicable they will be installed on the demonstration areas and recommended for individual farms outside these areas.

Sportsmen and farmers can participate in the Cooperative Farm Game Habitat Development program with the assurance that the planting of the perennials now being recommended and distributed by the Commission will do as much for farm game restoration as any other management measure. We welcome your comments regarding the program and ask that you express your views on it so that we may improve and expand it as the opportunity arises. We will be glad to answer any mail inquiries promptly and we will provide field assistance within the limits of available time and personnel.



Multiflora rose makes an inexpensive and impenetrable fence which is excellent farm game cover. (Photo Courtesy Missouri Conservation Commission).



Detail of Rosa multiflora.

A TRIBUTE TO A DOG

The one absolute, unselfish friend that man can have in this selfish world—the one that never deserts him, the one that never proves ungrateful or treacherous is his dog.

Gentlemen of the jury, a man's dog stands by him in prosperity and in poverty, in health and in sickness. He will sleep on the cold ground, where the wintry winds blow and the snow drives fiercely, if only he can be near his master's side. He will kiss the hand that has no food to offer, he will lick the wounds and sores that come in encounter with the roughness of the world. He guards the sleep of his pauper master as if he were a prince. When all other friends desert, he remains. When riches take wings and reputation falls to pieces he is as constant in his love as the sun in its journey through the heavens. If misfortune drives the master forth an outcast in the world, friendless and homeless, the faithful dog asks no higher privilege than that of accompanying him to guard against danger, to fight against his enemies. And when the last scene of all comes, and death takes the master in its embrace, and his body is laid away in the cold ground, no matter if all other friends pursue their way, there by his grave-side will the noble dog be found, his head between his paws, his eyes sad but open in alert watchfulness, faithful and true even to death.

—Hon. George Vest

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

THE WILDLIFE RESOURCES COMMISSION HAS SET 9:00 A.M. DECEMBER 1 AS THE DATE AND HOUR FOR A MEETING TO FORMULATE THE 1949 FISHING REGULATIONS. THE MEETING, AS ARE ALL OTHERS, WILL BE OPEN TO THE PUBLIC. INTERESTED SPORTSMEN WILL BE GIVEN AN OPPORTUNITY TO MAKE RECOMMENDATIONS FOR NEXT YEAR'S RULES. THE MEETING WILL BE HELD IN THE HILLSBORO STREET ANNEX OF THE REVENUE BUILDING, RALEIGH.

* * * *

THE HOLLY SHELTER WILDLIFE MANAGEMENT AREA WILL BE OPENED TO THE PUBLIC FOR A BIG GAME HUNT ON NOVEMBER 2, 4, 6, 9, 11, 13, 16, 18 & 20. DAILY HUNTING PERMITS COSTING $1.00 PER HUNTER WILL BE ON SALE EACH MORNING OF THE OPEN DAYS AT THE AREA HEADQUARTERS. HUNTERS MAY HUNT DAILY UNTIL THEY HAVE BAGGED EITHER A MALE DEER WITH VISIBLE ANTLERS OR AN ADULT BEAR. HUNTERS MAY KILL ANY BOBCATS ENCOUNTERED IN THE AREA. DOGS WILL BE PROHIBITED EXCEPT ON SPECIAL PERMISSION OF THE REFUGE MANAGER FOR INDIVIDUALS TO USE A DOG ON A LEASH TO TRACK DOWN WOUNDED ANIMALS.

* * * *

MATTAMUSKEET WATERFOWL REFUGE WILL SEE ANOTHER ANNUAL HUNT THIS YEAR DURING THE MIGRATORY WATERFOWL SEASON. RESERVATIONS FOR BLINDS ON THE AREA WILL BE ACCEPTED BEGINNING 60 DAYS PRIOR TO THE SEASON AND THROUGHOUT THE SEASON. HUNTERS MUST HAVE A REGULAR RESIDENT OR NON-RESIDENT LICENSE TO HUNT, PLUS A FEDERAL DUCK STAMP AND A LAKE HUNTING PERMIT. RESERVATION FOR BLINDS AND GUIDE MAY BE MADE BY CONTACTING LINWOOD TUNNEL, REFUGE PROTECTOR, NEW HOLLAND, N. C. A CASHIER'S CHECK OR MONEY ORDER FOR $10.00 MUST ACCOMPANY RESERVATION REQUESTS.

* * * *

FINAL OKAY HAS BEEN GIVEN BY THE WILDLIFE RESOURCES COMMISSION TO PURCHASE A PATROL PLANE TO BE USED IN LAW ENFORCEMENT PATROL DUTY.THE PLANE SHOULD BE IN POSSESSION OF THE COMMISSION BY THE TIME THIS MAGAZINE GOES TO PRESS.

* * * *

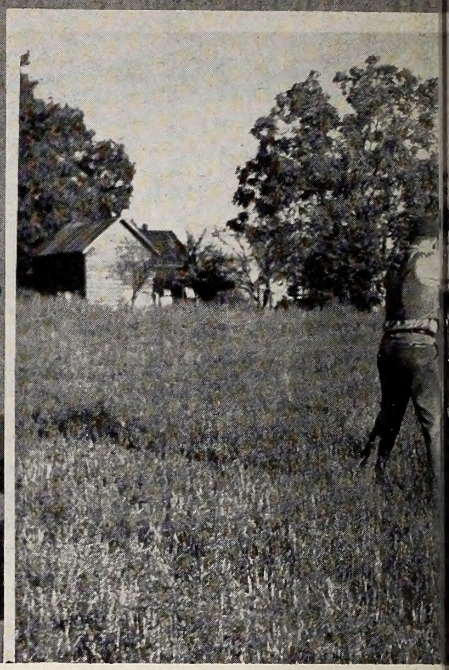
AS A FURTHER ADJUNCT TO AN INCREASINGLY EFFICIENT LAW ENFORCEMENT PROGRAM THE WILDLIFE COMMISSION HAS AUTHORIZED CREATION OF A FOUR-MAN MOBILE WILDLIFE PATROL WHICH WILL CRACK DOWN ON GAME AND FISH LAW VIOLATORS WHEREVER NEEDED. THE WILDLIFE PATROL MAY OPERATE AS A GROUP OR SINGLY AS CIRCUMSTANCES DICTATE. THE GROUP WILL BE DIRECTED FROM THE RALEIGH OFFICE. TWO MEMBERS WILL HEADQUARTER IN THE COASTAL PLAINS AREA OF THE STATE, ONE EACH IN THE PIEDMONT AND MOUNTAIN SECTIONS. MEMBERS OF THE PATROL WILL BE EMPLOYED IN ADDITION TO THE REGULAR LAW ENFORCEMENT STAFF.

* * * *

AS A FURTHER AID TO THE ENFORCEMENT OF FISH AND GAME LAWS ALL EMPLOYEES OF THE N. C. WILDLIFE RESOURCES COMMISSION NOT PREVIOUSLY HAVING HAD AUTHORITY TO MAKE ARRESTS MAY NOW DO SO. FISH AND GAME TECHNICIANS AND ADMINISTRATIVE PERSONNEL HAVE BEEN AUTHORIZED TO ACT AS DEPUTY GAME PROTECTORS.

* * * *

FOUR HUNDRED THREE FISH AND GAME LAW VIOLATORS PAID $6,330.00 IN FINES AND COSTS DURING THE MONTH OF OCTOBER FOR BREAKING THE RULES. HUNTING AND FISHING WITHOUT LICENSES AGAIN LED THE LIST, WITH HUNTING OUT OF SEASON SECOND IN FREQUENCY. THERE WERE FIVE CONVICTIONS FOR DYNAMITING FISH. FISH DYNAMITERS PAID $147.00 EACH FOR THEIR EFFORTS.



DON'T MAKE T

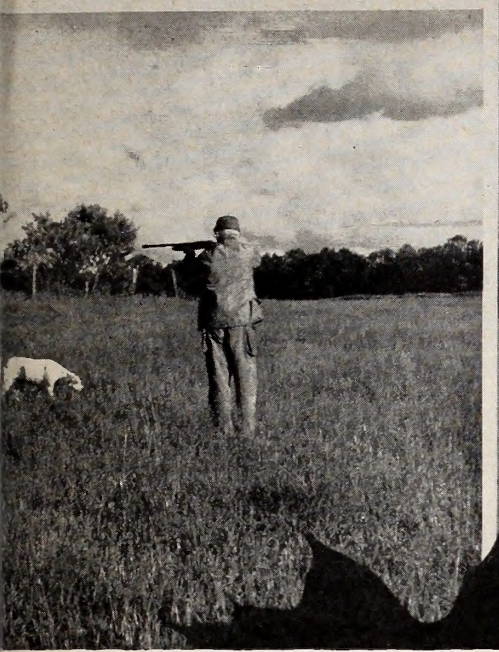
If You Want Farme on Th

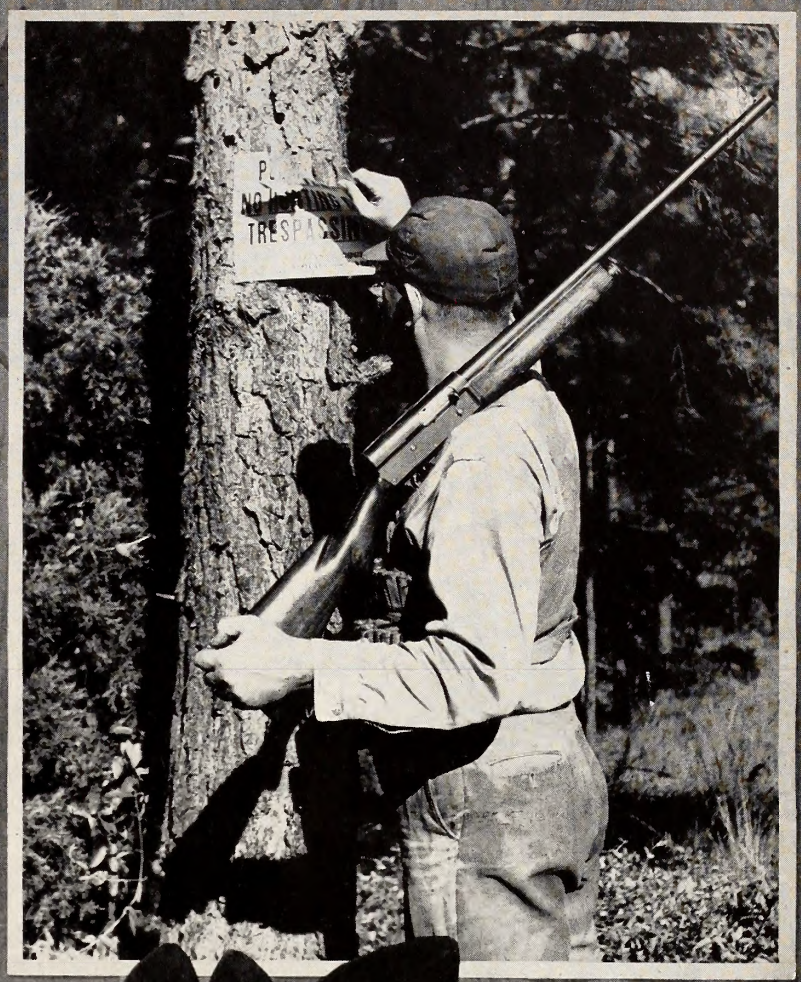
Don't trample down his valuable field crops.

Don't shoot toward his house and farm buildings.

Don't tear down his "No Trespassing" signs.

A sportsman is a gentleman. Be a mission before going on their





HESE MISTAKES

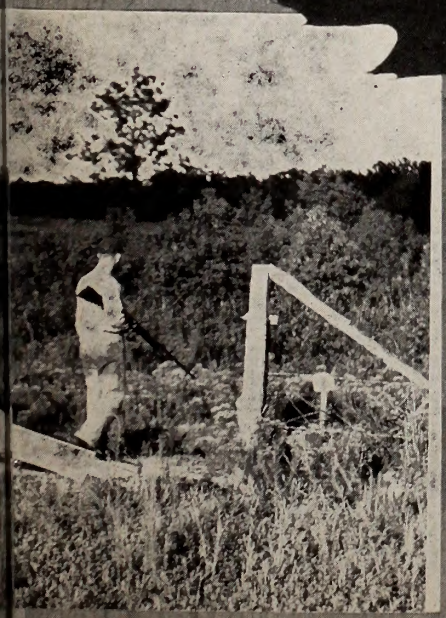
s to Welcome You
r Land

Don't steal fruit from his orchards.

Don't tear down fences and leave gates open.

Don't use his "Posted" signs for target practice.

entleman and ask farmers for per-
nd. (Photos by Jack Dermid.)



WE CAN HAVE MORE TURKEYS!

By Robert Wheeler—Wild Turkey Project Leader

A number of Wildlife Clubs have expressed a desire to sponsor some phase of game management work in their county. Many of these organizations have been and are now engaged in purchasing seed or plants for distribution to interested farmers in an effort to improve conditions for upland game. Quail are being pen-reared for liberation on suitable range and other aspects of game management are being conducted by these clubs. Such work is indicative of real interest. The Commission is aware of the value of these undertakings and is anxious to assist in every way possible.

It was recently suggested that a coöperative program be instituted whereby the Commission may assist those clubs that are interested in establishing, developing and maintaining their own forest game management unit. A wildlife club or any other organization that maintains an open membership is qualified to participate in the program. Hunting privileges will be controlled by the membership.

The Commission requests that the club lease the land, post it and bear the cost of development. The Commission will draft the management plan and direct the work. In addition, the Commission will provide the heavy equipment for land clearing on a cost basis.

The State would like to establish and develop a refuge unit in every county in which a suitable location occurs. However, the lack of sufficient funds and personnel precludes the institution of such a vast program. At present, the funds delegated to this type of work are being utilized to develop a number of refuge units. Areas under management are the Orton State Game Refuge in Brunswick County; Uwharrie Game Refuge, Montgomery County; and the Sandhills Unit in Richmond and Scotland counties. Plans are being formulated for the devolopment of a portion of the Soil Conservation Service lands in Caswell County and a part of the territory in the Camp Butner Reservation in Granville County.

When the above mentioned areas have been fully developed and are carrying the maximum population of game, their effect on the overall hunting conditions in the State will be negligible. These units will only result in increasing the forest game supply in adjacent territories; their principal contribution being demonstration areas. In order to attain a marked increase in the population of forest game, it is necessary that management areas be developed in as many counties as suitable range is available.

As was pointed out above, it is impossible for the Commission to finance a management program that is adequate in scope to insure a continued and sufficient yield of forest game that will satisfy the ever-increasing number of sportsmen. However, if the Wildlife Clubs and similar organizations will avail themselves of the opportunity of creating their own managed units, under the coöperative plan presented below, the supply of forest game can be increased materially and maintained.

A Model Forest Game Management Unit

If an area is to be made productive of forest game and yield returns in keeping with the cost, it must possess certain basic characteristics and be managed in a scientific manner. After the initial development work is accomplished, the cost of maintaining a unit in a high state of production is very inexpensive.

If the work is properly planned and directed, it is compatible with good land-use. Forest game management can be practiced on an area that is utilized primarily for the production of timber without damage to the stand and will not interfere with the harvest of the trees.

A few fundamental facts and figures regarding the management unit and its development follow.

Description of a Suitable Area

An area to be developed for forest game (wild turkey in particular) should include not less than 10,000 acres of land that is well watered and which

is growing to a variety of mature timber types that are composed of approximately 50 per cent hardwoods—one half of which is oak. Twenty per cent or 2,000 acres in the center of the tract should be developed and maintained as a refuge and the surrounding 8,000 acres utilized as a territory for hunting after the game has increased to a sufficient density on the area as a whole. The amount of game harvested annually should be predetermined and based upon the current surplus.

Plan and Cost of Developing a 2,000 Acre Refuge for Wild Turkeys

The following plan and cost estimate for the development of a 2,000 acre refuge for wild turkeys is based on the assumption that it will be necessary to clear five per cent of the area. As a rule, a considerable portion of any timbered tract is composed of old field sites that can be improved at small cost and with little effort. At least five per cent of the refuge unit should be in open fields. The forest clearings should be well distributed within the area and should not contain, as a rule, more than five nor less than one acre. Twenty per cent of the openings (20 acres) should be planted to winter crops and 10 per cent of the cleared area (10 acres) planted to summer crops. A 2,000 acre refuge, therefore, should include 100 acres of open

Ideal turkey range should have about 5% of the land cleared. Clearing is the most expensive item of turkey habitat development. Shown here are two of the Wildlife Resources Commission's bulldozers in action clearing land for later planting to winter and summer crops.

fields, 20 acres of which should be sown to winter greens and 10 acres to summer growths.

The table below presents a recommended plan for developing the refuge and the approximate cost involved for a five-year period.

First Year

Clear 20 acres	$500.00
Plant 7½ acres; winter crops, 5 acres; summer crops, 2½ acres	$101.25
Total	$601.25

Second Year

Clear 20 acres	$500.00
Plant 10½ acres; winter crops, 7 acres; summer crops, 3½ acres	$141.75
Total	$641.75

Third Year

Clear 20 acres	$500.00
Plant 15 acres; winter crops, 10 acres; summer crops, 5 acres	$202.50
Total	$702.50

Fourth Year

Clear 20 acres	$500.00
Plant 22½ acres; winter crops, 15 acres; summer crops, 7½ acres	$303.75
Total	$803.75

Fifth Year

Clear 20 acres	$500.00
Plant 30 acres; winter crops, 20 acres; summer crops, 10 acres	$405.00
Total	$905.00
Grand Total	$3,654.25

The only expenditure of any consequence after the fifth year is that of planting 20 acres of winter cereal which costs about $285.00 per annum. The uncultivated, cleared land requires an occasional burn or mowing which will perpetuate a sod of native grasses and legumes. This maintenance work and predator control can be achieved at very little cost.

At the end of the five-year period, the entire 100 acres will have been cleared and the maximum amount of winter and summer supplemental foods planted. The summer plantings can be discontinued at this time as the native grasses and legumes should be well established on enough of the cleared land, thus providing an ample supply of native warm-weather foods.

The following is a break-down of the cost of development:

Cost of Clearing

Estimated cost of clearing and disking an acre $25.00 (The Commission will make available a T.D. 18 International bulldozer and 3,000-pound Bush and Bogue disc for $7.00 per hour. Average time required to clear and disc an acre —3½ hours.)

Cost of Planting One Acre of Winter Crops

Labor and Material	Cost
Preparation and planting	$ 5.00
Lime (one ton per acre—$7.00) effective for five years	$ 1.40
Fertilizer (6-8-6) $35.00 per ton—200 pounds per acre	$ 3.50
Seed (oats-wheat-rye) $3.50 per bushel—1¼ bu. per acre	$ 4.35
Total	$14.25

Cost of Planting One Acre of Summer Crops

Preparation and planting	$ 5.00
Fertilizer (6-8-6) $35.00 per ton—200 pounds per acre	$ 3.50
Seed (German millet)—20 pounds $2.00, Chufa—½ bu. $5.00	$ 3.50
Total	$12.00

The Club is expected to handle the purchase of the seed and fertilizer and to engage local labor and equipment to make the plantings.

What the Sportsmen May Expect

It is only natural that the sportsmen desire to know what they may expect in return for their investment. This can be answered by discussing a few aspects in the life history of the turkey and deer.

Wild Turkey

Population Density:

Research has disclosed that the maximum density which the wild turkey will tolerate is one bird per 25 acres. Such a population is possible only on intensively managed range of high quality. It follows then, that the refuge unit should carry a population of 80 birds when fully developed. The maximum density on the area surrounding the refuge will probably vary from one bird per 50 acres to one turkey per 100 acres depending on the carrying capacity of the land.

If the population on the unimproved portion of the area is one bird per 80 acres, the entire area should support 180 birds.

Annual Increment:

Investigation has indicated that the maximal, annual increment to a turkey population on intensely managed range is about 50 per cent. Assuming there are ten mature hens on the area to be developed and that enough males are present to effect proper fertilization of the eggs, it follows that the population should increase as follows:

Initial population
10 mature hens and 3 gobblers

First breeding season
20 birds

Second breeding season
40 birds

Third breeding season
80 birds

Fourth breeding season
160 birds

Harvest

The sportsmen can harvest by hunting from 40 to 50 gobblers per season after the close of the fourth breeding season without impairment to the breeding potential of the following spring.

Deer

Population Density:

Deer range of fair to excellent quality will support a density of one deer per 100 acres to one animal per 25 acres. A population of one deer per 50 acres is not excessive for most of the timbered lands in North Carolina that are growing primarily to hardwoods, due to the fact that most of the forested areas have been cut-over in recent years and a dense undergrowth is present.

Annual Increment:

An unimpeded increase in a deer herd results in a 75 per cent annual increase. However, allowing for losses due to stray dogs and man, it is well to figure on a 50 per cent increment per annum.

If there are ten mature does and three bucks on the area, a population of 160 deer or more should be present at the close of the fourth breeding season.

Assuming that the 10,000 acre tract will carry 200 deer, it would be safe to remove one half of the males (40) at the end of the fourth breeding season and 50 bucks per season thereafter.

Summary

1. A membership of 100 men can finance during a five-year period the complete development of a 2,000 acre forest game refuge within a 10,000 acre area at a maximum cost of less than $37.00 each.

2. Cost of maintaining the unit after the fifth year would amount to approximately $3.00 per member.

3. Approximately 50 gobblers and 50 bucks can be removed annually from the 8,000 acres surrounding the refuge without lessening the breeding potential.

4. The increase in upland game, as a result of management and protection, will be substantial and is a bi-product achieved at no cost.

A NATURE SHORT

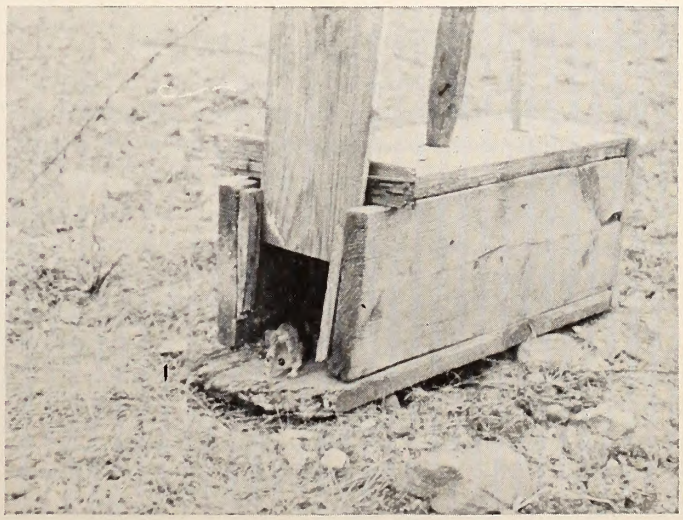
By Jack Dermid

This is the story of an encounter with the quaint little deer mouse, also known as the white-footed mouse, which is found, in one form or other, over the greater part of North America.

One warm Spring day while wandering about in a young pine woods, I discovered an abandoned rabbit trap in a small clearing. Curiously, I lifted one end of the affair and peered inside. From the entrance of a grass nest in the rear, a tiny rodent watched me anxiously with two large, black eyes. It sniffed the air several times and then withdrew from sight. Desiring a picture of the mouse, I replaced the trap, prepared my camera, and quietly seated myself nearby. In a few minutes, the deer mouse ventured to the front of the trap, but the noise of the shutter sent it scurrying back inside.

After taking a second picture, I shook the frightened creature out onto the ground, where it crouched motionlessly. Although mice are usually not considered beautiful, I believe the deer mouse is an exception. It is handsomely dressed with soft, fawn-colored fur above and with pure white underparts and feet, while large ears and protuberant eyes give it distinctive character.

Desiring the mouse for closer scrutiny, I made an attempt to catch it, but the agile creature jumped to one side and was gone in an instant. After being pursued persistently for several minutes on the ground, the deer mouse speedily climbed to the top of a small pine. I climbed after it and cornered it at the end of a branch, but, alas, it dropped some twelve feet to the ground, landing feet first. Then, the mouse ran a short distance and disappeared into a small burrow.



". . . a tiny rodent watched me anxiously with two large, black eyes."

This beautiful trout stream, the Cullasaja River, suffers from some silting, but is one of the most scenic in the Tennessee system. It is stocked annually by the Wildlife Resources Commission.

A SURVEY of the LITTLE TENNESSEE RIVER

Watch for a Survey Report on the Nantahala River next month

By Fred D. Morrison[1]

The Little Tennessee River rises in northern Georgia and is a sizable stream where it enters North Carolina some fifteen miles south of Franklin. From Franklin, where the Cullasaja River enters from the southeast, the stream flows in a northwesterly direction until it is joined by its two larger tributaries, the Nantahala and Tuckaseegee rivers. After its junction with the latter its course is almost directly west and its channel is blocked by two large power dams, Fontana and Cheoah. The former is the highest dam in the Eastern United States, and the lake formed by it provides excellent bass and pan fishing.

The river, from the Georgia state line to its junction with the Nantahala River, flows through a wide rolling valley which is especially hilly north of Etna. This valley is bordered on the west by the Nantahala Mountains and on the east by the Cowee Mountains and the Alarka-Jackson Line Mountains.

Some of the small tributary streams are in well protected, forested land, but many of them, and almost all of the larger streams, are in heavily farmed country where erosion is rampant. The excessive silting in practically all of the streams of the watershed is the result of poor farming practices, and poor fish habitat is only one of the consequences.

A total of about 135 miles of fishable water are

[1] The Stream Survey Party consisted of Dr. Joseph Bailey, leader; Frank Cross, Yates Barber, and Fred Morrison.

found in the Little Tennessee system of which about 75 miles may be classed as trout waters, while the remaining 60 miles are better suited to bass or pan fish. This of course does not include the waters of Fontana and Cheoah lakes which greatly relieve the fishing pressure in all of the streams in that general area.

Chemical Data

Chemical analyses were made at six stations and conditions were found to be very favorable for the support of game fishes. The dissolved oxygen in the waters ranged from 9.0 to 10.2 parts per million. The pH varied from 6.9 (very slightly acid) to 7.3 (only slightly alkaline). Free carbon dioxide was 1.5 to 1.6 parts per million which is well within the limits of tolerance. Carbonates were present in a very low concentration: 4.0 to 8.0 parts per million.

Temperature Data

Water temperatures of the tributaries of the Little Tennessee River were favorable for trout. However, the fact that 82° was the highest air temperature recorded during the period that these temperatures were taken, and the fact that there were numerous thunder showers during the period, indicates that many of these streams probably become much warmer during hot, dry weather.

Food Conditions

Food conditions in the Little Tennessee system were poor, as was found to be so in the other river systems which were surveyed during the summer of 1947. Only one station out of twenty-six was reported to have food conditions which were medium; the remaining twenty-five stations were reported as poor. At the six stations at which actual volume measurements were taken of bottom samples, the number of organisms ranged from 2.5 to 61 per square foot of bottom surface, and with a volume of .08 cc. to 4.03 cc. Most streams had one or several species of forage fish, and crayfish were also common in most of the streams.

Present Distribution and Status of Game Fish

Few of the streams in this section of the Little Tennessee system can be considered as really good trout streams. Many of the streams are small and even though stocked heavily each year they are soon "fished out" with the result that there is little or no natural reproduction to supplement the stocking program.

Although many of the streams in this system rise in National Forests where the watershed is protected, most of them leave the forest boundaries by the time they become sizable streams capable of supporting a fair fish population. Unfortunately, Wayah Creek is the only stream in the area that is under a coöperative management program. The desirability of a management program under the U. S. Forest Service and the North Carolina Wildlife Resources Commission is shown by the increasing number of trout fishermen who each year turn to managed waters for better trout fishing.

The main streams, the lower Cullasaja and the Little Tennessee itself, are unsuited for trout but might produce some good smallmouth bass fishing, though both streams are heavily silted. Perhaps the best trout stream in the area is the Cullasaja River above and including the gorge of the Cullasaja. North Pond River, Coweeta, Tellico, Burningtown, Alarka, Buck, Turtle Pond (Turkey Creek), and Cartoogechaye creeks are at present all marginal rainbow or brown trout streams but with proper management could be greatly improved. Cartoogechaye Creek in particular might be developed into a good brown trout stream. The two most important factors that will improve the streams of this area are erosion control and streamside improvement.

Stream	*Mileage suitable for management*		
	Rainbow	*Brown*	*Bass and Panfish*
Little Tennessee River (between Ga. state line and Nantahala R.)			42
Alarka Creek	15.5		
Coweeta Creek	6.0		
Cullasaja River	12.5		7.5
Brush Creek	3.0		
Buck Creek	8.0		
Ellijay Creek			6.5
North Prong River	3.0		
Turtle Pond Creek (Turkey Creek)	4.0		
Cartoogechaye Creek		8.5	
Jones Creek			5.5
Wayah Creek	5.5		
Burningtown Creek	10.0		
Stecoah Creek		5.5	
Tellico Creek	5.0		
Totals	73.5	14.0	61.5

Table 1. Mileage of waters of the Little Tennessee River (above Fontana Reservoir) which are suitable for management.

WHERE CREDIT IS DUE

In the October issue was a very excellent article entitled "If You Hunted Doves." Through an oversight, however, the article was printed without letting our readers know who wrote it. The author is Mr. Leonard E. Foote of Marietta, Georgia. Mr. Foote is a field representative of the Wildlife Management Institute and is making an important contribution to coöperation of Federal, State, and private institutions in restoring our wildlife resources. These agencies are grateful for the fine coöperation of North Carolina dove hunters during the dove survey.

NOTES on the FOOD HABITS of the HORNED OWL

The Great Horned Owl May Not Be As Bad As He Is Often Pictured

By JACK DIERMID

Birds of prey are unusual in their feeding habits in that they tear their victims into sizable chunks and swallow them bones, fur, and all. Then, after the digestible portions have been utilized, the indigestible parts are formed into compact pellets and regurgitated. Owls commonly have favorite roosts in tall pines or other trees offering similar protection in a secluded section of the woods. There the characteristic pellets often accumulate in large numbers.

In Wake County last winter, a great horned owl used an abandoned hawk's nest for a short period as its roost. Its presence was quite evident, for it whitewashed the understory trees with its droppings, and a few pellets were found. On one occasion, I surprised the owl on the nest. It did not seem disturbed by my intrusion and stared viciously toward me, its feathered "horns" fully erected. This owl is a huge bird, and there is little wonder that it is feared by the smaller creatures of the forest.

An examination of pellets found in the area indicates that the great horned owl is quite efficient in catching rodents. Since the hair and bones are not apparently harmed by digestion, they serve as an important index to the owl's food habits. In addition

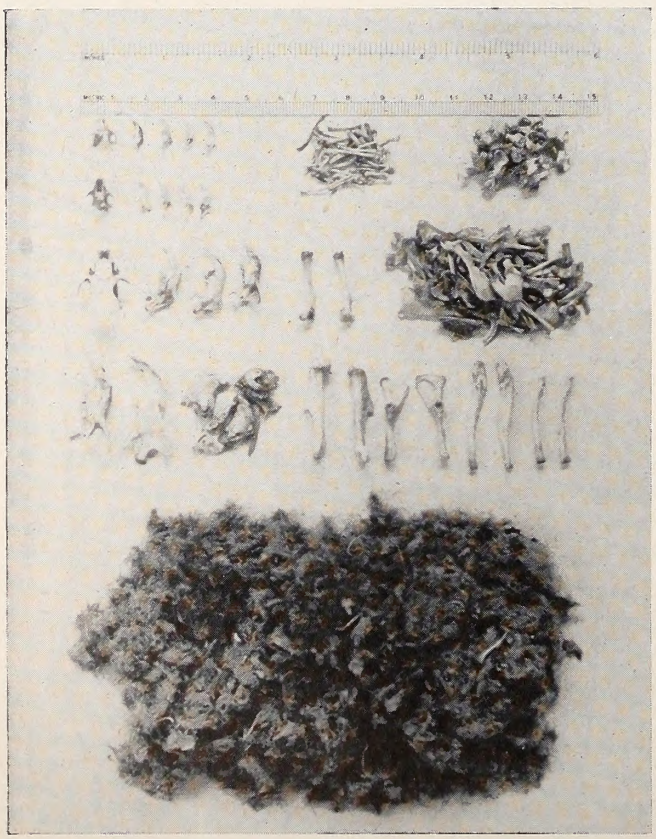
Owl "pellets" are indigestible masses of bones, hair and feathers which the bird regurgitates at intervals.

they provide information on the types of wildlife common in the vicinity. It should be significant to note that none of the pellets examined contained any evidence of birds.

Let us examine one of the owl's pellets. It is the largest one I found at the roost, and measured nearly four inches long, two inches wide, and one and one-fourth inches thick. It weighed more than one-half an ounce. Now that is quite a mouthful to regurgitate, even for a much larger animal. In outward appearance, the pellet resembles a gray mass of hair with a few bones showing irregularly. It is surprising how firmly it was packed, and how little it was damaged by a sixty foot fall to the ground. Of course body fluids aided in holding the pellet together.

When the pellet was opened, parts of the skeletons of at least seven individual rodents were found. The skull and teeth are important in identifying the various species, and the largest set of bones belonged to one of the European house rats that have spread throughout this country. The medium-sized skull was identified as that of a cotton rat, an important predator of quail nests. Surely, the owl aided mankind when it destroyed these two pests. The smallest skulls were probably those of the diminutive harvest mouse, but identification was not certain, because the jumping mice also have grooved upper incisor teeth. At any rate, the great horned owl is not always the enemy of man as commonly supposed.

The quest for and the examination of owl's pellets is an interesting activity for the nature enthusiast that will not only increase his knowledge of the outdoors, but may lead to an important contribution toward the determination of the food habits of the many species of owls.



Above are shown the bones and hair from several small rodents taken from an owl pellet. No bird bones or feathers were found in this specimen.

THE NOVEMBER GAME OUTLOOK

Small game, such as quail, rabbits, and squirrels, provide the most sport to the most people despite their size as compared to deer or bears. Rabbits are probably the most abundant game species, with squirrels running a close second. The rabbit season opens November 25 and extends through January 10, with a daily bag of seven bunnies and a possession limit of 14.

The Cottontail — America's Number One Game Animal.

Quail are abundant nowhere in the state, but have at least been holding their own. There has been a good nesting season this year, with no heavy or prolonged rains during the brooding period. Most quail shooting will occur in the coastal and Piedmont counties where quail are more numerous than in the mountain section. The quail season opens and closes with the rabbit season. The daily bag allowance is eight birds, with 16 in possession and a season limit of 100. Quail will benefit more from the abolition of lay days than any other species. In past years lay days have given scattered coveys a chance to re-group with a resultant heavy kill on the day following a rest period.

Grouse are an exceptional game bird in North Carolina in that there is little danger of their being killed off by hunting. They are confined to the rugged areas of the mountain counties, and a great deal of stamina on the part of the hunter is necessary to bag them. Although a definite "grouse cycle" has never been established on the North Carolina grouse population, biologists believe that grouse here are approaching or passing a peak in population, and the species can stand considerable shooting this year. North Carolina borders on the extreme southern range of grouse. The season dates correspond with those on rabbits, with a daily bag of two, possession limit of four, and a season limit of ten birds.

The turkey season opens on traditional Turkey Day, and extends through January 10 with a daily bag of one gobbler, possession limit two, season limit 6. Hunters killing hens will be prosecuted.

Wild turkeys are among the wariest of North Carolina's game birds, and are probably the most scarce. They are very scarce in the mountains with larger populations confined to an area extending from the central piedmont to the coast. A single biological factor, however, makes future turkey hunting a reality instead of a dream. A sex ratio of one gobbler to five hens is adequate for reproduction, and for that reason shooting can be permitted as long as only gobblers are killed. Restricting turkey kills to "gobblers only" imposes a responsibility on hunters, who this year will have to make sure that their target wears a long beard before they pull the trigger. The best advice for turkey hunters to follow is: "If you're not sure, don't shoot."

QUAIL COVEY SIZES

(Continued from page seven)

Division of Game, Fish and Seafoods and Mr. E. C. Martin, Coördinator of the Federal Aid Program in Alabama for permission to use the above data.

References Cited

Errington, Paul L. and Hamerstrom, F. N. Jr. 1935. *Bobwhite Winter Survival on Experimentally Shot and Unshot Areas. Journ. of Science*, Iowa State College, Ames, 9: pp. 625-39, 1934-5.

1936. *The Northern Bob-White's Winter Territory.* Iowa State College Agri. Exp. Sta. Research Bulletin 201, Ames, pp. 301-443, illus.

Errington, Paul L. and Stoddard, H. L. 1938. *Modifications in Predation Theory Suggested by Ecology Studies of the Bobwhite Quail.* Trans. 3rd N. A. Wild. Conf., Washington, pp. 736-40.

Ruhl, Harry D. 1947. *Reviewing Eight-years Operation of a Wildlife Experiment Station.* Trans. 12th N. A. Wild. Conf., Washington, pp. 496-503.

Stoddard, H. L. 1931. *The Bobwhite Quail, Its Habits, Preservation and Increase.* New York: Charles Scribner's Sons. pp. XXIX 559, illus.

Webb, J. W., Martin, E. C., and Wheeler, R. J., Jr. 1941. *Results of Statewide Quail Census.* Alabama Conservation, Montgomery, *13*, no. 2, pp. 9, 14.

It takes 3,000 cocoons to make a pound of raw silk. The worm which spins each cocoon eats fifty times its own weight in mulberry leaves.

GET IT OFF YOUR CHEST!

EDITORIAL COMMENT, LETTERS TO THE EDITOR AND ANECDOTES

Conducted by WIN DONAT

Again we ask for contributions to this page. Can it be that all hunting, fishing and out-doors questions have been settled? Surely you gun and dog lovers have plenty to argue about at club meetings —how about letting us in on these chestnuts? Just wrap them up in an envelope and address them to the janitor of this page. Maybe we'll drop the ball, or lead with our chin but it will be fun. How about it? Let's hear from you folks, ladies, too.

Q. Hubert Harris, Route 1, Box 251, Williamston, N. C., wants to know "if it is unlawful to take an unlicensed person along to row the boat on a fishing trip?"

A. Strictly speaking, this is not unlawful, and under certain conditions prescribed by law, such a person might even fish; but in any event, the decision as to whether a person is fishing unlawfully, is left entirely to the discretion of the Game Protector. Our advice is to be protected by a license.

Q. This one should interest lots of folks: L. J. Liggon, Wake County School Bus Garage, Raleigh, N. C., asks, "I do a lot of deer hunting . . . and have heard that the buck sheds his antlers every year. That is hard for me to believe. . . ."

A. Strangely enough, the Virginia whitetailed buck does shed his antlers in the late winter and grows a new spread before the next fall. The discarded racks are seldom found as they are often gnawed upon by woods rodents as they contain a good source of mineral foods.

Q. One of our lady friends, Mrs. W. I. Powell, 513 Florence Street, Raleigh, N. C., wants us to tell her the answer to this one: "If the Commission . . . would, for a short season, trap quail and pair them off, would not this greatly increase the coveys?"

A. The answer to this one has two heads. First the Commission has no authority from Dan Cupid to arrange pairings between Mr. and Miss Quail —nature seems to be the only agency capable of successfully doing that. Secondly, the reason that an area is entirely lacking in quail population is more often because of a food and housing shortage and not because the birds have been shot out. Therefore, transplanting any wildlife from an area where it has existed to one where existence might be a hardship, is a questionable procedure.

Q. Mr. J. O. Stanton, P. O. Box 1527, Raleigh, N. C., sent us this interesting one: "To what extent will otters destroy game fish in farm ponds, and should they be permitted to exist in these ponds?"

A. The answer to this would be a matter of personal choice. The otter is a valuable fur animal. His pelt, when prime, is worth real money. It is true that his diet consists of fish and our guess is that all sorts are edible. In addition, the fact that otters would live on a pond should delight the true Sportsman. The fish that they would consume might have a tendency to level off the population thereby providing larger and better fish for the angler, other conditions being favorable.

Bank swallows were once believed to hibernate in the bottoms of lakes and streams during winter months.

Falcons strike their prey with closed talons, catching the dead or stunned victim in mid-air as it plummets earthward.

The shad is the most valuable fish of the Atlantic Coast and next to the Pacific Salmon, the most important species inhabiting the waters of North America.

The African black porcupine attacks his enemies by running at them backwards.

Human ears cannot hear the incessant clamor of the bat as he flits about overhead because the bat's signaling voice lies in the wave band of about 50,000 cycles or vibrations per second. Human ears can only detect sound in the band from 20 to 20,000 cycles.

Attention Wildlife Club Members!

The North Carolina Wildlife Federation has invited WILDLIFE IN NORTH CAROLINA, the official publication of the Wildlife Resources Commission, to publish news items and other wildlife conservation material regarding State Federation activities and the activities of its affiliated clubs.

WILDLIFE IN NORTH CAROLINA has accepted this invitation. News of wildlife clubs, — their activities and the comments and opinions of their members will become a regular feature of this magazine each month.

WILDLIFE IN NORTH CAROLINA cordially invites all other organizations and individual sportsmen interested in better hunting and fishing to become regular contributors of material which other hunters and fishermen will enjoy reading.

The following statement was made by Mr. Roland McClamroch of Chapel Hill, newly-elected president of the North Carolina Wildlife Federation: "I sincerely regret that a restricted budget has made necessary discontinuing publication of FRIEND O' WILDLIFE, the official organ of the Wildlife Federation. We are fortunate, however, in having the close coöperation of WILDLIFE IN NORTH CAROLINA, which has accepted our invitation to publish news items and other material regarding Federation activities as a regular monthly feature. I wish to take this opportunity to urge all club members to subscribe to this magazine as a means of keeping in touch with Federation affairs. I will have a special message in the December 1948 issue."

This month we are sending a sample copy of WILDLIFE IN NORTH CAROLINA to each member of the Federation. You members who are already subscribers will receive a sample copy in addition to your regular copy. We hope you will pass along your extra copy to a fellow sportsman who will enjoy reading it.

All who are not regular subscribers to WILDLIFE IN NORTH CAROLINA are invited to subscribe now, using the convenient subscription blank form below. The subscription price is only 50c per year. Keep up with the latest developments in the amplified state-wide conservation program of your Wildlife Resources Commission by reading WILDLIFE IN NORTH CAROLINA each month!

To: N. C. Wildlife Resources Commission

Box 2919, Raleigh, North Carolina

Enclosed is $..... for which I will receive a .....-year subscription to WILDLIFE IN NORTH CAROLINA.

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